

Two new species of *Megasporoporia* (*Polyporales*, *Basidiomycota*) from tropical China

PING DU

duping7374@163.com

*Institute of Microbiology, P.O. Box 61, Beijing Forestry University
Beijing 100083, China*

BAO-KAI CUI*

**Corresponding author, baokaicui@yahoo.com.cn*

*Institute of Microbiology, P.O. Box 61, Beijing Forestry University
Beijing 100083, China*

Abstract — Two new polypores, *Megasporoporia ellipsoidea* sp. nov. and *M. violacea* sp. nov., found from tropical forests in Hainan Province of southern China, are described and illustrated. *Megasporoporia ellipsoidea* differs from other species in the genus by its cream to orange yellow pore surface, larger pores (1–1.5 per mm), barrel to calabash-shaped gloeocystidia, and ellipsoid basidiospores. *Megasporoporia violacea* is distinguished in the genus by having greyish violet to pale fawn brown pore surface, smaller pores (5–7 per mm), abundant dendrohyphidia, and cylindrical to oblong-ellipsoid basidiospores, and by lacking of hyphal pegs. An identification key to *Megasporoporia* species is provided.

Key words — lignicolous fungi, poroid fungi, taxonomy

Introduction

Megasporoporia Ryvarden & J.E. Wright was established by Ryvarden et al. (1982) based on *Poria setulosa* Henn. 1901. The genus is characterized by resupinate basidiocarps, large basidiospores, a dimitic to trimitic hyphal structure with clamped generative hyphae and dextrinoid skeletal hyphae, presence of rhomboid or bipyramidic crystals in hymenia, and species of the genus cause a white rot mostly on fallen angiosperm branches or twigs (Dai & Cui 2008, Zhou & Dai 2008).

Taxonomy and diversity of poroid wood-decaying fungi were studied intensively from China during recent years (Dai et al. 2003, 2007, 2008; Dai & Cui 2005, Cui & Dai 2006, 2008, Cui et al. 2007, 2008a, b). During the survey of wood-rotting fungi in the tropical forests of Jianfengling Nature

Reserve, Hainan Province, southern China, two collections were observed with characters fitting the genus *Megasporoporia* well, and they were described as two new species here.

Materials and methods

The studied specimens were deposited at the herbarium of the Institute of Microbiology, Beijing Forestry University (BJFC). Sections were studied at magnification up to $\times 1000$ by using a Nikon Eclipse E 80i microscope and phase contrast illumination. Drawings were made with the aid of a drawing tube. Microscopic features, measurements and drawings were made from slide preparations stained with Cotton Blue and Melzer's reagent. Spores were measured from sections cut from the tubes (Cui et al. 2009). In presenting the variation in the size of the spores, 5% of measurements were excluded from each end of the range, and were given in parentheses. In the text of following abbreviations were used: IKI = Melzer's reagent, IKI- = negative in Melzer's reagent, KOH = 5% potassium hydroxide, CB = Cotton Blue, CB+ = cyanophilous, CB- = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios between the specimens studied, n = number of spores measured from given number of specimens. Special colour codes followed Petersen (1996) and Anonymous (1969).

Descriptions

Megasporoporia ellipsoidea B.K. Cui & P. Du, sp. nov.

FIG. 1

MYCOBANK MB 514079

Carpophorum annuum, resupinatum. Facies pororum crenea bubalinua vel lutea; pori rotundi vel angulati, 1–1.5 per mm. Systema hypharum dimiticum, hyphae generatoriae fibulatae, hyphae skeletales subiculi 2.8–4.9 μm in diam. Sporae hyalinae, ellipsoideae, IKI-, CB-, 12–15 $\times$ 6–8.2 μm .

TYPE. — China. Hainan Province, Ledong County, Jianfengling Nature Reserve, on fallen angiosperm branch, 18.XI.2007 Cui 5222 (holotype in BJFC).

ETYMOLOGY — *ellipsoidea* (Lat.): referring to the ellipsoid basidiospores.

FRUITBODY — Basidiocarps annual, resupinate, easily to separate from the substrate, no odour or taste when fresh, becoming corky upon drying, up to 10 cm long, 2 cm wide, and 0.8 mm thick at centre. Sterile margin distinct, orange yellow, up to 1 mm wide. Pore surface cream buff when fresh, becoming buff to orange yellow when dry; pores round to angular, 1–1.5 per mm; dissepiments thin, entire. Subiculum buff yellow to orange yellow, corky, azonate, up to 0.2 mm thick. Tubes concolorous with the pore surface, corky, up to 0.6 mm long, tube walls frequently covered with hyphal pegs.

HYPHAL STRUCTURE — Hyphal system dimitic; generative hyphae bearing clamp connections; skeletal hyphae very weakly dextrinoid, CB+; all hyphae unchanged in KOH.

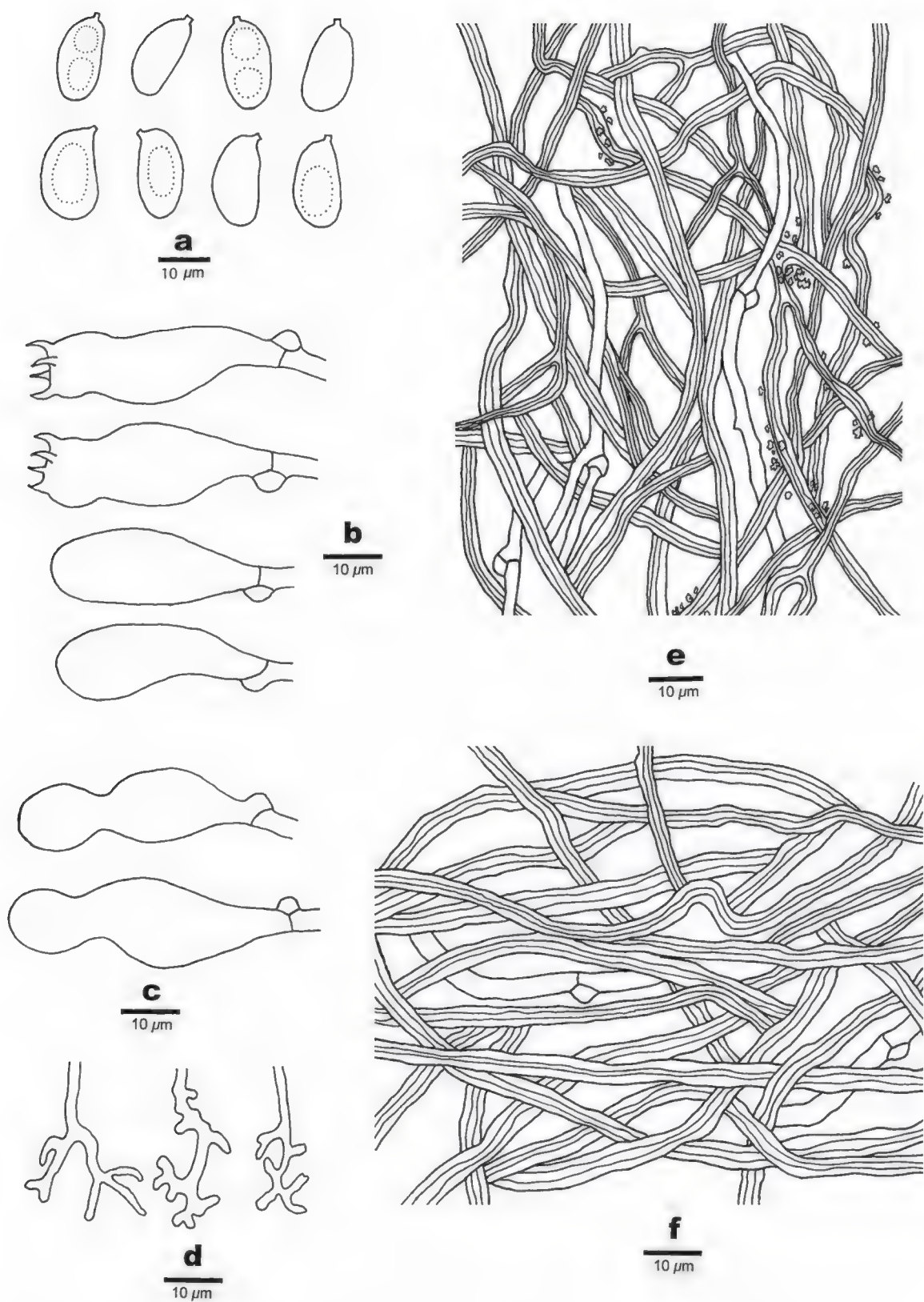


FIG. 1. Microscopic structures of *Megasporoporia ellipsoidea* (drawn from the holotype).
—a: Basidiospores. —b: Basidia and basidioles. —c: Gloeocystidia. —d: Dendrohyphidia.
—e: Hyphae from trama. —f: Hyphae from subiculum.

SUBICULUM — Generative hyphae infrequent, hyaline, thin-walled, occasionally branched, 2–3.2 µm in diam; skeletal hyphae dominant, thick-walled with a wide to narrow lumen, rarely branched, interwoven, 2.8–4.9 µm in diam.

TUBES — Generative hyphae infrequent, hyaline, thin-walled, occasionally branched, 1.8–2.8 μm in diam; skeletal hyphae dominant, thick-walled with a wide to narrow lumen, frequently branched, more or less straight to flexuous, sometimes coarsely encrusted, 2–3.7 μm in diam. Hyphae of hyphal pegs hyaline, thin- to fairly thick-walled, branched; dendrohyphidia frequently in hymenium and dissepimental edges, delicately branched in the upper part. Gloeocystidia present, barrel to calabash-shaped, thin-walled, smooth, 26–45 $\times$ 11–15.3 μm . Basidia barrel-shaped, sometimes constricted, with a basal clamp connection and four sterigmata, 23–40 $\times$ 9–15 μm ; basidioles barrel-shaped, distinctly smaller than basidia. Rhomboid or bipyramidic crystals frequently present.

SPORES — Basidiospores ellipsoid, hyaline, thin-walled, smooth, usually bearing one or two big guttules, IKI–, CB–, (11–)12–15(–18) $\times$ 6–8.2(–9) μm , L=13.8 μm , W=7.18 μm , Q=1.92 (n=30/1).

REMARKS — *Megasporoporia ellipsoidea* is characterized by its cream to orange yellow pore surface and larger pores (1–1.5 per mm), calabash-shaped gloeocystidia, ellipsoid basidiospores. It may be confused with *M. major* (G.Y. Zheng & Z.S. Bi) Y.C. Dai & T.H. Li 2002, both have dendrohyphidia, hyphal pegs and similar pores, but the latter has cream to wood coloured pores with pale luteous margin, oblong ellipsoid to subcylindrical basidiospores (16–20 $\times$ 5.5–7.1 μm), subulate and sharp-pointed cystidioles, and lacks gloeocystidia (Dai & Li 2002).

Megasporoporia ellipsoidea has similar basidiospores with *M. rhododendri* Y.C. Dai & Y.L. Wei 2004, however, the latter has smaller pores (4–5 per mm), lacks hyphal pegs and dendrohyphidia (Dai et al. 2004).

***Megasporoporia violacea* B.K. Cui & P. Du, sp. nov.**

FIG. 2

MYCOBANK MB 514080

Carpophorum annuum, resupinatum. Facies pororum violaceum vel violaceo-ardesiaceum; pori rotundi vel angulati, 5–7 per mm. Systema hypharum dimiticum, hyphae generatoriae fibulatae, hyphae skeletales subiculi 2–4.5 μm in diam. Sporae hyalinae, cylindricae, IKI–, CB–, 11–14.9 $\times$ 3.2–5 μm .

TYPE. — China. Hainan Province, Ledong County, Jianfengling Nature Reserve, on fallen angiosperm branch, 11.V.2009 Cui 6570 (**holotype** in BJFC).

ETYMOLOGY — *violacea* (Lat.): referring to the violet pore surface.

FRUITBODY — Basidiocarps annual, resupinate, difficult to separate from substrate, hard corky, without odour or taste when fresh, becoming hard corky upon drying, up to 20 cm long, 3 cm wide, and 1 mm thick at centre. Sterile margin distinct, pinkish buff, up to 1 mm wide. Pore surface violet when fresh, greyish violet to pale fawn brown when dry; pores round to angular, 5–7 per mm; dissepiments thick, entire. Subiculum cream to pinkish buff, hard corky,

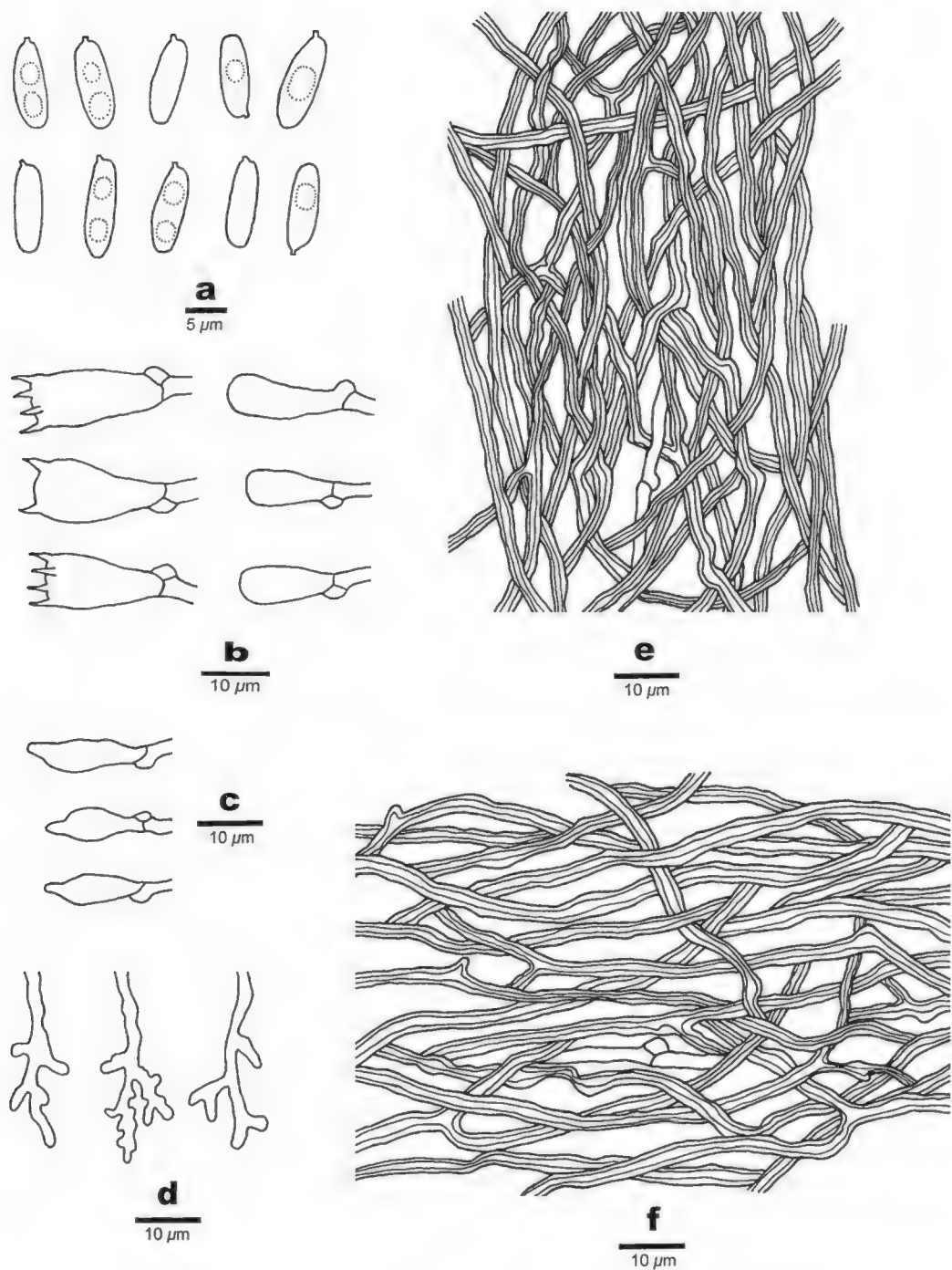


FIG. 2. Microscopic structures of *Megasporoporia violacea* (drawn from the holotype).
—a: Basidiospores. —b: Basidia and basidioles. —c: Cystidioles. —d: Dendrohyphidia.
—e: Hyphae from trama. —f: Hyphae from subiculum.

azonate, up to 0.2 mm thick. Tubes concolorous with the pore surface, corky, up to 0.8 mm long.

HYPHAL STRUCTURE — Hyphal system dimitic; generative hyphae bearing clamp connections; skeletal hyphae strongly dextrinoid, CB+; all hyphae unchanged in KOH.

SUBICULUM — Generative hyphae infrequent, hyaline, thin-walled, occasionally branched, 1.8–3 µm in diam; skeletal hyphae dominant, thick-walled with a wide to narrow lumen, frequently branched, mostly flexuous, interwoven, agglutinated, 2–4.5 µm in diam.

TUBES — Generative hyphae infrequent, hyaline, thin-walled, occasionally branched, 1.5–2.5 µm in diam; skeletal hyphae dominant, thick-walled with a wide to narrow lumen, frequently branched, flexuous, interwoven, 1.8–3.3 µm in diam. Dendrohyphidia present in hymenium and dissepimental edges, hyphal pegs absent. Cystidia absent; cystidioles present, subulate or ventricose, thin-walled, smooth, $9.8\text{--}15.8 \times 4\text{--}5$ µm. Basidia barrel-shaped, with a basal clamp connection and four sterigmata, $13\text{--}18.5 \times 5\text{--}9.8$ µm; basidioles basically clavate, distinctly smaller than basidia. Polyhedric crystals frequently present among subhymenium and hymenium.

SPORES — Basidiospores cylindrical, hyaline, thin-walled, smooth, usually bearing one or two big guttules, IKI–, CB–, $(10\text{--})11\text{--}14.9(-15.2) \times (3\text{--})3.2\text{--}5(-5.2)$ µm, $L=12.58$ µm, $W=4.22$ µm, $Q=2.83\text{--}3.16$ ($n=60/2$).

ADDITIONAL SPECIMEN (PARATYPE) EXAMINED — China. Hainan Province, Ledong County, Jianfengling Nature Reserve, on fallen angiosperm branch, 11.V.2009 Cui 6601b.

REMARKS — *Megasporoporia violacea* is unique in the genus by its distinct sterile margin, violet to greyish violet pore surface, smaller pores (5–7 per mm), presence of both cystidioles and dendrohyphidia, but lacking of hyphal pegs.

Megasporoporia violacea is similar to *M. cystidiolophora* B.K. Cui & Y.C. Dai 2007 by having cystidioles and similar basidiospores, but the latter has pale pinkish brown to salmon coloured pores. In addition, *M. cystidiolophora* has larger pores (3–5 per mm) and cystidioles ($17\text{--}23.2 \times 5.3\text{--}8$ µm), and it lacks dendrohyphidia (Cui & Dai 2007).

Megasporoporia minuta Y.C. Dai & X.S. Zhou 2008 was described from Guangxi Autonomous Region of southern China recently. It has smaller pores (6–8 per mm, Zhou & Dai 2008), which is similar to those of *M. violacea*, however, it has distinctly shorter basidiospores and lacks cystidioles and dendrohyphidia.

Ten species have previously been transferred to or described in the genus *Megasporoporia* (Ryvarden et al. 1982, Gilbertson & Ryvarden 1987, Dai & Wu 2004, Dai et al. 2004, Cui & Dai 2007, Dai & Cui 2008, Zhou & Dai 2008): *M. cavernulosa* (Berk.) Ryvarden 1982, *M. cystidiolophora*, *M. hexagonoides* (Speg.) J.E. Wright & Rajchenb. 1982, *M. major*, *M. mexicana* Ryvarden 1982, *M. minuta*, *M. quercina* Y.C. Dai 2004, *M. rhododendri*, *M. setulosa* (Henn.) Rajchenb. 1982, *M. subcavernulosa* Y.C. Dai & Sheng H. Wu 2004. An identification key to the species of *Megasporoporia* is provided.

Key to species of *Megasporoporia*

1. Basidiospores > 20 µm in length *M. mexicana*
1. Basidiospores < 20 µm in length 2
2. Basidiospores mostly < 3 µm in width *M. quercina*
2. Basidiospores mostly > 3 µm in width 3
3. Gloeocystidia present *M. ellipsoidea*
3. Gloeocystidia absent 4
4. Basidiospores > 16 µm in length 5
4. Basidiospores < 16 µm in length 6
5. Pores 0.5–1 per mm, pore surface ash grey *M. hexagonoides*
5. Pores 1–1.5 per mm, pore surface cream *M. major*
6. Pores 5–8 per mm 7
6. Pores 1–5 per mm 8
7. Basidiospores > 11 µm in length *M. violacea*
7. Basidiospores < 11 µm in length *M. minuta*
8. Dendrohyphidia present 9
8. Dendrohyphidia absent 10
9. Hyphal pegs present *M. subcavernulosa*
9. Hyphal pegs absent *M. cavernulosa*
10. Cystidioles absent *M. setulosa*
10. Cystidioles present 11
11. Basidiospores > 6 µm in width *M. rhododendri*
11. Basidiospores < 6 µm in width *M. cystidiolophora*

Acknowledgements

We express our gratitude to Drs. Michal Tomsovsky (Brno, Czech Republic) and Zheng Wang (Yale University, USA) who reviewed the manuscript. The research was financed by the Ministry Science and Technology of China (Project No. 2008BADB0B03) and Beijing Forestry University (Project No. BLX2007014).

Literature cited

- Anonymous. 1969. Flora of British fungi. Colour identification chart. Her Majesty's Stationery Office, London. 1 p.
- Cui BK, Dai YC. 2006. *Wrightoporia* (Basidiomycota, Aphyllophorales) in China. Nova Hedwigia 83: 159–166.
- Cui BK, Dai YC. 2007. Polypores from Tianmushan Nature Reserve in Zhejiang Province, eastern China. Mikologiya Fitopatologiya 41: 506–514.
- Cui BK, Dai YC. 2008. *Skeletocutis luteolus* sp. nov. from southern and eastern China. Mycotaxon 104: 97–101.

- Cui BK, Dai YC, Decock C. 2007. A new species of *Perenniporia* (Basidiomycota, Aphyllophorales) from China. *Mycotaxon* 99: 175–180.
- Cui BK, Dai YC, Li BD. 2009. Notes on the genus *Rigidoporus* (Basidiomycota, Polyporaceae) in China. *Nova Hedwigia* 88: 189–197.
- Cui BK, Wang Z, Dai YC. 2008a. *Albatrellus piceiphilus* sp. nov. on the basis of morphological and molecular characters. *Fungal Diversity* 28: 41–48.
- Cui BK, Yuan HS, Dai YC. 2008b. Wood-rotting fungi in eastern China 1. Polypores from Wuyi Mountains, Fujian Province. *Sydowia* 60: 25–40.
- Dai YC, Cui BK. 2005. Two new species of the *Hymenochaetaceae* from eastern China. *Mycotaxon* 94: 341–347.
- Dai YC, Cui BK. 2008. Notes on *Megasporoporia* (Basidiomycota, Polyporales) in China. *Mycosystema* 4: 604–607.
- Dai YC, Cui BK, Decock C. 2008. A new species of *Fomitiporia* (Hymenochaetaceae, Basidiomycota) from China based on morphological and molecular characters. *Mycological Research* 112: 375–380.
- Dai YC, Harkönen M, Niemelä T. 2003. Wood-inhabiting fungi in southern China 1. Polypores from Hunan Province. *Annales Botanici Fennici* 40: 381–393.
- Dai YC, Li TH. 2002. *Megasporoporia major* (Basidiomycota), a new combination. *Mycosystema* 21: 519–521.
- Dai YC, Wei YL, Wang Z. 2004. Wood-inhabiting fungi in southern China 2. Polypores from Sichuan Province. *Annales Botanici Fennici* 41: 319–329.
- Dai YC, Wu SH. 2004. *Megasporoporia* (Aphyllophorales, Basidiomycota) in China. *Mycotaxon* 89: 379–388.
- Dai YC, Yuan HS, Zhang XQ, Wang Z. 2007. Systematic revisit of *Sparsitubus* (Basidiomycota, Aphyllophorales), an unusual cyphelloid-like polypore from China. *Fungal Diversity* 25: 37–47.
- Gilbertson RL, Ryvarden L. 1987. North American polypores 2. *Megasporoporia*–*Wrightoporia*. *Fungiflora*, Oslo. 885 pp.
- Petersen JH. 1996. Farvekort. The Danish Mycological Society's colour-chart. Foreningen til Svampekundskabens Fremme, Greve. 6 pp.
- Ryvarden L, Wright JE, Rajchenberg M. 1982. *Megasporoporia* a new genus of resupinate polypores. *Mycotaxon* 16: 172–182.
- Zhou XS, Dai YC. 2008. A new species of *Megasporoporia* (Polyporales, Basidiomycota) from China. *Mycological Progress* 7: 253–255.